GAU, Faculty of Engineering

Course Unit Title	Logic Circuit Design
Course Unit Code	ENG205
Type of Course Unit	Compulsory, Computer and EE engineering students
Level of Course Unit	2nd Year BSc
National Credits	4
Number of ECTS Credits Allocated	6 ECTS
Theoretical (hour/week)	3
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	2
Semester when the course unit is delivered	3
Mode of Delivery	Face to Face, Laboratory Experiments
Language of Instruction	English
Prerequisities and co-requisities	-
Recommended Optional Programme Components	-

Objectives of the Course:

- Number Systems and Conversions
- Boolean Algebra and Basic Theorems
- Simplification of Boolean Functions
- Combinational Circuits

Learning Outcomes

When this course has been completed the student should be able to		Assesment.
1	Recall the Number-Base conversions and Binary Numbers	1
2	Use the Map-method for Boolean Function Simplification	1
3	Relate the well-known Combinational Circuits	1
4	Design Combinational Circuits	1
5	Conduct experiments and interpret obtained data	3,5

Assesment Methods: 1. Written Exam, 2. Assignment 3. Project/Report, 4.Presentation, 5 Lab. Work

Course's Contribution to Program

		CL
1	Ability to understand and apply knowledge of mathematics, science, and engineering	4
2	Ability to design and conduct experiments as well as to analyze and interpret data	5
3	Ability to work in multidisciplinary teams while exhibiting professional responsibility and ethical conduct	3
4	Ability to apply systems thinking in problem solving and system design	4
5	Knowledge of contemporary issues while continuing to engage in lifelong learning	1
6	Ability to use the techniques, skills and modern engineering tools necessary for engineering practice	3
7	Ability to express their ideas and findings, in written and oral form	3
8	Ability to design and integrate systems, components or processes to meet desired needs within realistic constraints	4
9	Ability to approach engineering problems and effects of their possible solutions within a well structured, ethically responsible and professional manner	3

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate 4: High, 5:Very High)

Course Contents

Week		Topics	Exams
1	Chapter 1	Binary numbers, Number-Base conversions, Octal and Hex. Numbers	
2		Complements, Subtraction with Complements	
3	Chapter 2	Axiomatic Definition of Boolean Algebra, Theorems and Properties	
4		Boolean Functions, Canonical and Standard Forms	
5	Chapter 3	Digital Logic Gates, NAND and NOR implementation	
6		The Map method, Two-Variable Map and Three-Variable Map	Quiz 1
7		Four -Variable Map, Five-Variable Map	
8			Midterm
9		Product of Sums Simplification, Don't care conditions, etc.	
10	Chapter 4	Combinational circuits, Design Procedure	
11		Binary Adder,Subractor and Multiplier	Quiz 2
12		Magnitude Comparator	
13		Decoders, encoders	Quiz 3
14		"	Lab. Exam
15			Final

Recommended Sources

Textbook: Digital Design, M. Morris Mano and Michael D. Ciletti, Pearson Education, (4th Edition 2007) (Other editions are also useful)

Supplementary Material (s): Digital Fundamentals, Thomas L. Floyd, Prentice-Hall International, 1997

Assessment

Attendance	5%	
Laboratory	10%	
Midterm Exam (Written)	30%	
Quiz (Written)	15%	
Final Exam (Written)	40%	
Total	100%	

ECTS Allocated Based on the Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including the Exam week)	15	3	45
Labs and Tutorials	8	2	16
Assignments	-	-	-
Project/Presentation/Report Writing	8	2	16
E-learning Activities	-	-	-
Quizzes	3	8	24
Midterm Examination	1	12	12
Final Examination	1	12	12
Self Study	14	3	42
Total Workload			167
Total Workload/30 (h)			5.57
ECTS Credit of the Course			6